Thoughts on Edge Virtual Bridging

Joe Pelissier
new-pelissier-EVBThoughts-0509
EVB Weekly Discussion

- EVB has been meeting weekly
- Three major problem / solutions have been discussed:
  - Embedded Bridges (aka VEB)
  - VEPA
  - Interface Virtualizers
- In addition, various management paradigms have been discussed
  - Applicable to all of the above
Embedded Bridges

- In virtualized environments, bridges may be embedded in servers
  - Hardware or Software
- These bridges can be fully 802.1Q compliant
- However, many operate a little bit different from the standard:
  - Many have taken advantage of close integration with the hypervisor and VNICS
    - For example, eliminates need to learn / age
  - In addition, being edge devices, these bridges may not forward between uplinks
  - There seems to be commonality in these functions and such bridges have been deployed and have been proven useful
    - Might make sense to standardize
  - However – these bridges do operate a little bit different, so they do add somewhat to management complexity
VEPA

- VEPA modifies the behavior of an embedded bridge
  - In general, embedded bridge in ingress performs its normal functions, then forwards frame to adjacent (external) bridge
  - External bridge *augments* functionality of embedded bridge
    - Packet processing (TCAMs, ACLs, etc.)
    - Security features such as: DHCP guard, ARP monitoring, source port filtering, dynamic ARP protection/inspection, etc.
    - Enhanced monitoring capabilities e.g. statistics, NetFlow, sFlow, rmon, port mirroring, etc.
  - External bridge forwards frame back to VEPA (“Hairpin turn”)
    - VEPA forwards frame to destination similar to any other bridge
      - MAC/VLAN lookup, etc.
- Defines two new (relatively simple) behaviors
  - Embedded bridge: forward frames externally
  - External bridge: hairpin turn
- New behavior complicates network management
Interface Virtualizer

- High density server deployment (including but not limited to virtualized servers) creates a proliferation of bridges in the network
- Many of these bridges are operating largely as a simple mux
  Essentially operate as fan in / fan out to higher level bridges
- Yet these bridges are responsible for a significant proportion of the network’s capital expenditure, operational, and management costs
- Interface Virtualizers replace these specific bridges collapsing the number of bridges in the network
  IVs essentially become ports of the bridge to which they are attached
  Not independently managed; managed much like a line card in a bridge
  Much simpler (i.e. more cost effective device)
- Intended for use in the “branches and leaves”
  Not exclusively used at the end station
- Reduction in network complexity and associated management
Observations

- All three devices provide independent and valuable benefits to networks

- All three solve separate problems
  
  VEPA more-or-less a superset of embedded bridging function

- None of these devices effectively address the issues addressed by the other two

- All three compliment and interoperate in the same network cleanly
  
  Various combinations may be mixed and match for optimal usage in any given environment

- All three appear to have strong commitment by individuals to complete standards work
Proposed Next Step

- Develop appropriate PAR and 5C (or set of PARs and 5Cs) for next meeting
- Work together to make all three efforts successful
Thank You!